General Specifications

GS 05P01D81-01EN

UT35A/MDL, UT32A/MDL Controllers
(Mount on DIN Rail)

UTAdvanced
Functional Enhancement

■ Overview

The UT35A/MDL and UT32A/MDL controllers can be mounted in a panel. A ladder sequence function is included as standard. The short depth of the controller helps save instrument panel space. The UT35A/UT32A also support open networks such as Ethernet communication.

■ Features

- Simple panel surface
  Mounting the controller in a panel simplifies the panel surface.
- Ladder sequence function is included as standard.
  This function allows for creating a simple sequence control. Dedicated LL50A Parameter Setting Software (sold separatly) allows for performing programming using a ladder language.
- Various built-in open network functions such as Ethernet are available.
  Easy connection with various vendors' PLCs is possible. (UT32A support CC-Link and RS485 communication only.)
- Quick setting function
  Setting only the minimum necessary parameters for operation is possible.
- Equipped with a multitude of functions
  Universal I/O and retransmission output are included as standard. PID control, heating/cooling control, etc. are available.
- LL50A Parameter Setting Software (sold separately)
  The parameters and ladder programs of UTAdvanced controller can be built from a PC using this software. It makes data management even easier.

UT35A/MDL

UT32A/MDL

■ Functional Specifications

Control Specifications

(1) Control Mode

Single-loop control

(2) Control period

200 ms

Table of Number of Inputs and Outputs

Model and suffix code (See the model code)	Number of analog input points	Number of analog output points (*1)	Number of contact input points	Number of contact output points (*3)
UT35A				
-×0×/MDL	1	1	2	3
-×2×/MDL	1	1 (*2)	7	8
UT32A				
-×0×/MDL	1	1	2	3
-×1×/MDL	1	1	2	3

*1: Excluding control output
*2: The analog output point can be used as either cooling control output or transmission output.
*3: Excluding control output relays

■ Control Computation Function

(1) Types of control

- PID control
- ON/OFF control
- Two-position two-level control (*4)
- Heating and cooling control (*4)

*4: Selectable for heating and cooling control

(2) Control Computation Function

(a) Target setting point and the number of PID parameter groups
Respectively, four sets of target setpoints, alarm setpoints, and PID parameters can be set.

(b) Selecting the PID parameter group
The following PID parameter groups can be selected.

- Target setpoint number (SPNO) (The PID number can be set arbitrarily.)
- Measured input zone PID
- Target setpoint zone PID
- Reached target setpoint zone PID

(c) Auto-tuning

- Tuning results can be selected from two options, Normal or Stable.
- Tuning output limit can be set. (It cannot be used in heating/cooling control.)

(d) "Super" function: Overshoot-suppressing function
(e) "Super 2" function: Hunting-suppressing function
(f) STOP preset output function
(g) Input ERROR preset output function
(h) MANUAL preset output function

(3) Operation Mode Switching

Operation mode switching	AUTO/MANUAL and RUN/STOP switching REMOTE/LOCAL switching (only model with communication option)

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(4) Control Parameter Setting Range

Proportional band	0.1 to 999.9%
Integral time	1 to 6000 sec. or OFF (using manual reset)
Derivative time	1 to 6000 sec. or OFF
ON/OFF control hysteresis (one or two hysteresis points)	0.0 to 100.0% of measured input range width
Preset output value	-5.0 to 105.0% (however, 0 mA or less cannot be output)
High/low output limiter	-5.0 to 105.0% Low limit setpoint < high limit setpoint
Tight shut function	When manual control is carried out with 4 to 20 mA output, control output can be reduced to about 0 mA.
Rate-of-change limiter of output	0.1 to 100.0%/sec., OFF
Output deadband	For heating and cooling control: -100.0 to 50.0%

Alarm Functions

• Types of Alarm

Measured value alarm Deviation alarm Rate-of-change alarm	PV (measured value) high/low limit alarm Deviation high/low limit alarm Deviation high and low limits alarm Deviation within high and low limits alarm Analog input PV high/low limit alarm PV rate-of-change alarm
Setpoint alarm	SP (setpoint) high/low limit alarm Target SP high/low limit alarm Target SP deviation high/low limit alarm Target SP deviation high and low limits alarm Target SP deviation within high and low limits alarm
Output alarm	Control output high/low limit alarm Cooling control output high/low limit alarm
Other alarms	Self-diagnosis alarm FAIL

• Alarm Functions

Alarm output action	Alarm stand-by action Alarm latch (forced reset) function Alarm hysteresis Alarm ON/OFF delay timer
Number of alarm settings	4
Number of alarm output points	Up to 8 (differs by model code)

Contact I/O Function

This function allows for allocating the input error condition, operation condition, alarm condition or other conditions to the contact input and contact output.

Contact input	AUTO/MANUAL switching
	REMOTE/LOCAL switching (only model with communication option)
	STOP/START switching
	Switching to AUTO
	Switching to MANUAL
	Switching to REMOTE (only model with communication option)
	Switching to LOCAL (only model with communication option)
	AUTO-TUNING START/STOP switching
	SP number specification
	PID number specification
	Manual preset output number specification
Contact output	Alarms 1 through 4
	Status output

Ladder Sequence Function

(1) Number of I/O Points

	UT35A/MDL	UT32A/MDL
Number of digital input points	Up to 7	Up to 2
Number of digital output points	Up to 8	Up to 3

This is limited by the number of contact I/O signal points. (See the model code.)

(2) Types of Command

	Number of commands	Remark
Number of basic command types	13	Load, AND, OR, Timer, Counter, etc.
Number of application command types	73	Comparison, reverse, addition/subtraction/multiplication/division, logic operation, high/low limiter, etc.

(3) Sequence Device

	Types of device	Number of points
Digital I/O	Input relay	7 (max)
	Output relay	8 (max)
Internal device	M relay (bit data)	256
	DAT register (data)	28
	P register (parameter)	10
	K register (constant)	30
Special device	Special relay (bit data)	12

Process data and process relay can be used besides the above-mentioned.

(4) Program capacity

Max Program capacity: 300 steps *

*: Available number of steps differs according to the parameters and using command.

(5) Ladder computation period

Ladder computation period is the same as control period.

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Communication Function

	Function	Method	Interface	Targets	Max connection	Communication Data
Modbus/TCP	A standard industry protocol allowing communications between the controller and devices such as PCs, PLCs, and DCSs.	Server	Ethernet	PLC and others	2 connections	PV, SP, OUT, ALM etc
		Gateway	Ethernet +RS-485	RS-485: UT75A/UT55A/UT52A/ UT35A/UT32A/UP55A/ UP35A/UM33A (*1)	31 units	
Modbus (RTU/ASCII)		Slave	RS-485	PLC and others, UT75A/UT55A/UT52A/ UT35A/UT32A/UP55A/ UP35A/UP32A/UM33A (*2)	31 units	
PROFIBUS-DP	Used for communication between PLCs and remote I/O, enabling high-speed data transmission.	Slave	RS-485	PLC and others	Number of nodes: 126	
		Modbus master function	RS-485	UT75A/UT55A/UT52A/ UT35A/UT32A/UP55A/ UP35A	31 Units (Main Controller is included.)	
CC-Link		Slave	RS-485	PLC and others	Number of nodes: 42 (Remote device)	
		Modbus master function	RS-485	UT75A/UT55A/UT52A/ UT35A/UT32A/UP55A/ UP35A\UP32A/UM33A	31 Units (Main Controller is included.)	
DeviceNet		Slave	RS-485	PLC and others	Number of nodes: 64	
		Modbus master function	RS-485	UT75A/UT55A/UT52A/ UT35A/UT32A/UP55A/ UP35A	31 Units (Main Controller is included.)	
Peer to peer	A protocol allowing multiple controllers to send and receive data between one another. The Ladder Program is used.	Multi-drop	RS-485 (2 wire only)	UT75A/UT55A/UT52A/ UT35A/UT32A/UP55A/ UP35A/UP32A	Read/Write: 4 units Read only : 28 units	
Coordinated Communication	A protocol to coordinate the operation of two or more instruments controlling the same process.	Master/Slave	RS-485	UT75A/UT55A/UT52A/ UT35A/UT32A/UP55A/ UP35A/UP32A/ UM33A(*2)	Master : 1 unit Slave : 31 units	
PC link	The proprietary Yokogawa protocol allowing communications to PCs, PLCs and touch panels.	Slave	RS-485	PC and others, UT75A/UT55A/UT52A/ UT35A/UT32A/UP55A/ UP35A/UP32A/ UM33A(*2)	31units	
Ladder	A protocol to communicate to PLCs.					

*1: UT digital indicating controller, Signal conditioner JUXTA, Power monitor POWERCERT can be connected.
*2: UT digital indication controllers can be connected.

Physical Interface

Ethernet
Standard : IEEE802.3 (10BASE-T, 100BASE-TX)
Max segment length : 100m
Max. Connecting Configguration : Cascade Max. 4 level (10BASE-T), Max. 2 level (100BASE-TX)

RS-485
Standard : EIA RS-485
Communication method : Two-wire harf-duplex or four-wire harf-duplex, start-stop synchoronization, and non-procedural
Baud rate : 600,1200,2400,4800,9600,19200 or 38400bps, Peer to peer communication is fixed at 19200bps
Maximum communication distance : 1200m
Terminating resistor : 220Ω (External)

PROFIBUS-DP
Standard : Field bus (IEC61158)
Corresponding version : DP V0
Baud rate : 9.6k, 19.2k, 45.45k, 93.75k, 187.5k, 0.5M, 1.5M, 3M, 6M, 12M, AUTO (*3)
Communication distance : 1200m (9.6k to 93.75k) 1000m (187.5k)
400m (0.5M) 200m (1.5M)
100m (3M to 12M)

*3: AUTO automatically sets the baud rate to that of the host controller (PROFIBUS-DP master).

CC-Link
Supported version : Remote device (Ver.1.10, Ver.2.00)
Baud rate : 156k, 625k, 2.5M, 5M, 10M bps
Transmission distance : 1.2km (156k bps), 600m (625k bps), 200m (2.5M bps), 150m (5M bps), 100m (10M bps)
When using optical repeater : 7.6 km (156k) to 4.3 km (10M)

DeviceNet
Field bus (IEC61158)
Baud rate 125k, 250k, 500k bps
Transmission distance 500m (125k bps), 250m (250k bps), 100m (500k bps)

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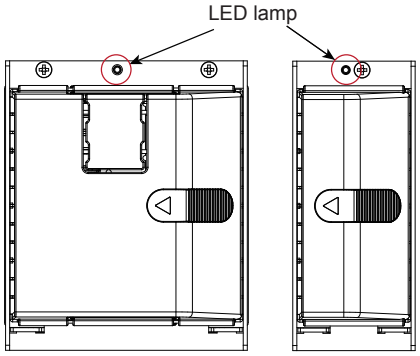
■ Hardware Specifications

Display Specifications

The controller status can be verified with the LED.

Status	LED	Lit/Blinks	Description
Normal	Green	Lit	
Communication error	Green	Blinks	
Instrument failure	Red	Lit	Parameter error/ Hardware failure/Ladder program corruption.
Input error	Red	Blinks	sensor burnout, input over



UT35A/MDL Front (with terminal cover)

UT32A/MDL Front (with terminal cover)

Universal Input Specifications

- Number of input points: 1
- Types of input, instrument range, and measurement accuracy (see the table below)

Types of input		Instrument range °C	Instrument range °F	Accuracy
Thermocouple	K	-270.0 to 1370.0°C	-450.0 to 2500.0°F	±0.1% of instrument range ±1 digit for 0°C or more ±0.2% of instrument range ±1 digit for less than 0°C However, ±2% of instrument range ±1 digit for less than -200°C of thermocouple K ±1% of instrument range ±1 digit for less than -200°C of thermocouple T
		-270.0 to 1000.0°C	-450.0 to 2300.0°F	
		-200.0 to 500.0°C	-200.0 to 1000.0°F	
	J	-200.0 to 1200.0°C	-300.0 to 2300.0°F	
	T	-270.0 to 400.0°C	-450.0 to 750.0°F	
		0.0 to 400.0°C	-200.0 to 750.0°F	
	B	0.0 to 1800.0°C	32 to 3300°F	±0.15% of instrument range ±1 digit for 400°C or more ±5% of instrument range ±1 digit for less than 400°C
	S	0.0 to 1700.0°C	32 to 3100°F	±0.15% of instrument range ±1 digit
	R	0.0 to 1700.0°C	32 to 3100°F	
	N	-200.0 to 1300.0°C	-300.0 to 2400.0°F	±0.1% of instrument range ±1 digit ±0.25% of instrument range ±1 digit for less than 0°C
	E	-270.0 to 1000.0°C	-450.0 to 1800.0°F	±0.1% of instrument range ±1 digit for 0°C or more ±0.2% of instrument range ±1 digit for less than 0°C However, ±1.5% of instrument range ±1 digit for less than -200.0°C of thermocouple E
	L	-200.0 to 900.0°C	-300.0 to 1600.0°F	
	U	-200.0 to 400.0°C	-300.0 to 750.0°F	
		0.0 to 400.0°C	-200.0 to 1000.0°F	
	W (*2)	0.0 to 2300.0°C	32 to 4200°F	±0.2% of instrument range ±1 digit
	Platinel 2	0.0 to 1390.0°C	32.0 to 2500.0°F	±0.1% of instrument range ±1 digit
	PR20-40	0.0 to 1900.0°C	32 to 3400°F	±0.5% of instrument range ±1 digit for 800°C or more Accuracy not guaranteed for less than 800°C
	W97 Re3-W75 Re25	0.0 to 2000.0°C	32 to 3600°F	±0.2% of instrument range ±1 digit
Resistance-temperature detector (RTD) 3-wire	JPt100	-200.0 to 500.0°C	-300.0 to 1000.0°F	±0.1% of instrument range ±1 digit (*1)
		-150.00 to 150.00°C	-200.0 to 300.0°F	±0.1% of instrument range ±1 digit
	Pt100	-200.0 to 850.0°C	-300.0 to 1560.0°F	±0.1% of instrument range ±1 digit (*1)
		-200.0 to 500.0°C	-300.0 to 1000.0°F	
		-150.00 to 150.00°C	-200.0 to 300.0°F	±0.1% of instrument range ±1 digit
Standard signal		0.400 to 2.0000 V	-	±0.1% of instrument range ±1 digit
		1.000 to 5.000 V	-	
		4.00 to 20.00 mA	-	
DC voltage		0.000 to 2.000 V	-	
		0.00 to 10.00 V	-	
		-10.00 to 20.00 mV	-	
DC current		0.00 to 20.00 mA	-	

The accuracy is that in the standard operating conditions: 23 ±2°C, 55 ±10%RH, and power frequency at 50/60 Hz.

*1: ±0.3°C and ±1 digit in the range between 0 and 100°C
±0.5°C ±1 digit in the range between -100 and 200°C

*2: W-5% Re/W-26% Re (Hoskins Mfg.Co.), ASTM E988

- Applicable standards: JIS, IEC and DIN (ITS-90) for thermocouples and resistance-temperature detectors (RTD)
- Input sampling period: Synchronized to control period

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- Burnout detection
  Upscale and downscale of function, and OFF can be specified for the standard signal of thermocouple and resistance-temperature detector (RTD). For integrated signal input, 0.1 V or 0.4 mA or less is judged as a burnout.
- Input bias current: 0.05 μA (for thermocouple and resistance-temperature detector (RTD))
- Resistance-temperature detector (RTD) measured current: About 0.16 mA
- Input resistance
  1 MΩ or more for thermocouple/mV input
  About 1 MΩ for voltage input
  About 250 Ω for current input (with built-in shunt resistance)
- Allowable signal source resistance
  250 Ω or less for thermocouple/mV input
  Effect of signal source resistance: 0.1 μV/Ω or less
  2 kΩ or less for DC voltage input
  Effect of signal source resistance: about 0.01%/100 Ω
- Allowable wiring resistance
  Up to 150 Ω per line for resistance-temperature detector (RTD) input (conductor resistance between the three lines shall be equal)
  Effect of wiring resistance: ±0.1°C/10 Ω
- Allowable input voltage/current
  ±10 V DC for thermocouple/mV/mA or resistance-temperature detector (RTD) input
  ±20 V DC for V input
  ±40 mA DC for mA input
- Noise reduction ratio
  40 dB or more (at 50/60 Hz) in normal mode
  120 dB or more (at 50/60 Hz) in common mode
- Reference junction compensation error
  ±1.0°C (15 to 35°C)
  ±1.5°C (-10 to 5°C and 35 to 50°C)

Contact Input Specifications

- Number of points: 2 points (standard)
  For the maximum number of points, see the model and suffix code table.
- Input type: no-voltage contact input or transistor contact input
- Input contact capacity: 12 V DC, 10 mA or more
  Be sure to use a contact with a minimum ON current of 1 mA or more
- ON/OFF detection
  For no-voltage contact input:
  Contact resistance 1 kΩ or less in ON state
  Contact resistance 50 kΩ or more in OFF state
  Transistor contact input:
  2 V or less in ON state
  Leak current 100 μ A or less in OFF state
- Status detection minimum hold time: control period + 50 ms
- Application: SP switching, operation mode switching, event input

Analog Output Specifications

- Number of points
  Control output (heating-side output): 1 point (standard), which is shared with transmission output
  Cooling-side output: 1 point, which is shared with transmission output
- Output functions
  Current output or voltage pulse output
- Current output
  4 to 20 mA DC or 0 to 20 mA DC/load resistance 600 Ω or less
- Current output accuracy
  ±0.1% of span (however, ±5% of span for 1 mA or less)
  The accuracy is that in the standard operating conditions: 23 ±2°C, 55 ±10%RH, and power frequency at 50/60 Hz
- Voltage pulse output
  Application: time proportional output
  ON voltage: 12 V or more/load resistance of 600 Ω or more
  OFF voltage: 0.1 V DC or less
  Time resolution: 10 ms or 0.1% of output value, whichever is larger

Retransmission Output Specifications

- Number of points: 1 point (standard), which is shared with 15 V DC loop power supply
  Additional 1 points when analog control output are not used
- Output function: current output
  4 to 20 mA DC or 0 to 20 mA DC/load resistance 600 Ω or less
- Current output accuracy (conversion accuracy from PV value on the set scale): ±0.1% of span (however, ±5% of span for 1 mA or less)
  The accuracy is that in the basic operating conditions: 23 ±2°C, 55 ±10%RH, and power frequency at 50/60 Hz
  This is not conversion accuracy through input and output but the performance of transmission output itself.

15V DC Loop Power Supply Specifications

- Number of points: 1 point (standard), which is shared with retransmission output
  Control output (1 point) can also be used.
- Supply voltage: 14.5 to 18.0 V DC
- Maximum supply current: about 21 mA (with short-circuit current limiting circuit)

Step Response Time Specifications

Within 1 s

(Response time at 63% of transmission output when a change is made stepwise in the range between 10 and 90% of input span)

Relay Contact Output Specifications

- Types of contact and number of points
  Control relay output: one 1c-contact point
  Control output of heating and cooling control: 2, 1a-contact points
  Alarm output: 3 1a-contact points (Common is separated)
- Contact rating
  1c-contact: 3 A at 250 V AC or 3 A at 30 V DC (resistance load)
  1a-contact:
  For alarm output: 1 A at 240 V AC or 1 A at 30 V DC (resistance load)
  For output of heating and cooling control relay output: 3 A at 240 V AC or 3 A at 30 V DC (resistance load)

*: The control output should always be used with a load of 10 mA or more.
The alarm output should always be used with a load of 1 mA or more.

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- Application: time proportional output, alarm output, FAIL output, etc.
- Time resolution for control output: 10 ms or 0.1% of output value, whichever is larger

Transistor Contact Output Specifications

- Number of points: see the model and suffix code table
- Output form: open collector (sink current)
- Output contact capacity: Up to 24 V DC, 50 mA
- Output time resolution: min 200 ms
- Application: alarm output, FAIL output, etc.

Heater Break Alarm Specifications (for /HA Option)

- Function: Measures the heater current using an external current transformer (CT) and generates a heater break alarm when the measured value is less than the disconnection detection value.
- Number of input points: 2 points
- Number of output points: 2 points (transistor contract output)
- CT input resistance: about 9.4 Ω
- CT input range: 0.0 to 0.1 Arms (0.12 Arms or more cannot be applied)
- Heater current alarm setting range: OFF, 0.1 to 300.0 Arms
  Heater current measured value display range: 0.0 to 360.0 Arms
  *: The CT ratio can be set. CT ratio setting range: 1 to 3300
- Recommended CT: CT from URD Co. Ltd.
  CTL-6-S-H: CT ratio 800, measurable current range: 0.1 to 80.0 Arms
  CTL-12L-30: CT ratio 3000, measurable current range: 0.1 to 180.0 Arms
- Heater current measurement period: 200 ms
- Heater current measurement accuracy: ±5% of CT input range span ±1 digit (CT error is not included)
- Heater current detection resolution: Within 1/250 of CT input range span
- Disconnection detection ON time: Minimum 200 ms. (for time proportional output)

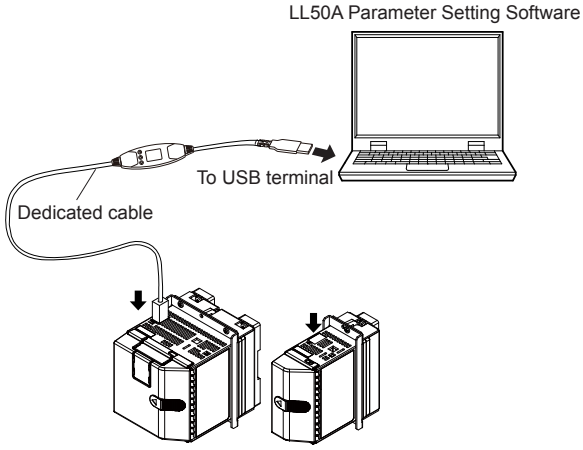
24 V DC Loop Power Supply Specifications (for /LP Option)

- Application: Power is supplied to the 2-wire transmitter.
- Supply voltage: 21.6 to 28.0 V DC
- Rated current: 4 to 20 mA DC
- Maximum supply current: About 30 mA (with short-circuit current limiting circuit)

Maintenace Port Specifications

The maintenance port is used to connect a dedicated cable when using the LL50A Parameter Setting Software (sold separately). Through this port, you can set controller parameters, download ladder programs, and so on.

For details, see the LL50A General Specifications (GS05P05A01-01EN).



Use LL50A with the controller turned on. (The dedicated cable must be connected. LL50A Light-loader adapter cannot be used.)

The maintenance port is not isolated from the PV input terminal. Use the port only for maintenance purposes, such as for setting the controller parameters.

Safety and EMC Standards

- Safety:
  Compliant with IEC/EN61010-1 (CE), IEC/EN61010-2-030 (CE), approved by CAN/CSA C22.2 No. 61010-1 (CSA), approved by UL61010-1.
  Controller with DIN rail (option /MDL): CE marking scheduled
  Installation category: II
  Pollution degree: 2
  Measurement category: I (CAT I) (UL, CSA)
  O (Other) (CE)
  Rated measurement input voltage: Max. 10 V DC
  Rated transient overvoltage: 1500 V (*)
  *: This is a reference safety standard value for measurement category I of IEC/EN/CSA/UL61010-1. This value is not necessarily a guarantee of instrument performance.
- EMC standards:
  Compliant with
  CE marking
  EN 61326-1 Class A, Table 2 (For use in industrial locations),
  EN 61326-2-3
  *: The instrument continues to operate at a measurement accuracy of within ±20% of the range during testing.
  EN 55011 Class A, Group 1
  EN 61000-3-2 Class A
  EN 61000-3-3
  EMC Regulatory Arrangement in Australia and New Zealand
  EN 55011 Class A, Group 1
- KC marking: Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance

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Power Supply Specifications and Isolation

- Power supply
  Rated voltage: 100 to 240 V AC (+10%/-15%), 50/60 Hz
  24 V AC/DC (+10%/-15%) (When the /DC option is specified)
- Power consumption: UT35A/MDL: 18 VA (For the /DC option. DC: 9 VA, AC: 14 VA)
  UT32A/MDL: 15 VA (For the /DC option. DC: 7 VA, AC: 11 VA)
- Storage: Nonvolatile memory
- Allowable power interruption time: 20 ms (at 100 V AC)
- Withstanding voltage
  2300 V AC for 1 minute between primary and secondary terminals (UL, CSA)
  3000 V AC for 1 minute between primary and secondary terminals (CE)
  1500 V AC for 1 minute between primary terminals
  500 V AC for 1 minute between secondary terminals
  (Primary terminals = Power (*) and relay output terminals, Secondary terminals = Analog I/O signal terminals, contact input terminals, communication terminals, and functional grounding terminals.)
  *: Power terminals for 24 V AC/DC models are the secondary terminals.
- Insulation resistance
  Between power supply terminals and a grounding terminal: 20 MΩ or more at 500 V DC
- Isolation specifications

PV (universal) input terminal, Maintenance port	Internal circuits	Power supply
Control and transmission (analog) output terminal (not isolated between the analog output terminals)		
Control relay (c-contact or 2 a-contact) output terminal		
Alarm-1 relay (a-contact) output terminal		
Alarm-2 relay (a-contact) output terminal		
Alarm-3 relay (a-contact) output terminal		
Contact input terminal (All) RS485 communication terminal (2 ports)		
24 V DC loop power supply terminal		
Contact output (transistor) terminal		
Ethernet/PROFIBUS-DP/CC-Link/DeviceNet communication terminal		

The circuits divided by lines are insulated mutually.

Environmental Conditions

Normal operating conditions

- Ambient temperature: -10 to 50°C
  If the CC-Link option is specified, 0 to 50 °C for UT35A/MDL; 0 to 40 °C for UT32A/MDL.
  (side-by-side mounting: 0 to 50 °C for UT55A/MDL; 0 to 40 °C for UT52A/MDL)
- Ambient humidity: 20 to 90% RH (no condensation)
- Magnetic field: 400 A/m or less
- Continuous vibration (at 5 to 9 Hz) Half amplitude of 1.5 mm or less
  (at 9 to 150 Hz) 4.9 m/s^2 or less, 1 oct/min for 90 minutes each in the three axis directions
- Rapid vibration: 14.7 m/s^2, 15 s or less
- Impact: 98 m/s^2 or less, 11 msec.
- Installation altitude: 2,000 m or less above sea level
- Warm-up time: 30 minutes or more after the power is turned on
- Start-up time within 10 s

Transportation and Storage Conditions

- Temperature: -25 to 70°C
- Temperature change rate: 20°C per hour or less
- Humidity: 5 to 95%RH (no condensation)

Effects of Operating Conditions

- Effect of ambient temperature
  For voltage or TC input:
  ±1 μ V/°C or ±0.01% of F.S. (instrument range)/°C, whichever is greater
  For RTD input:
  ±0.05°C/°C (ambient temperature) or less
  For current input:
  ±0.01% of F.S. (instrument range)/°C
  For analog output:
  ±0.02% of F.S./°C or less
- Effect of power supply fluctuation:
  For analog input: ±0.05% of F.S. (instrument range) or less
  For analog output: ±0.05% of F.S. or less
  (Each within rated voltage range)

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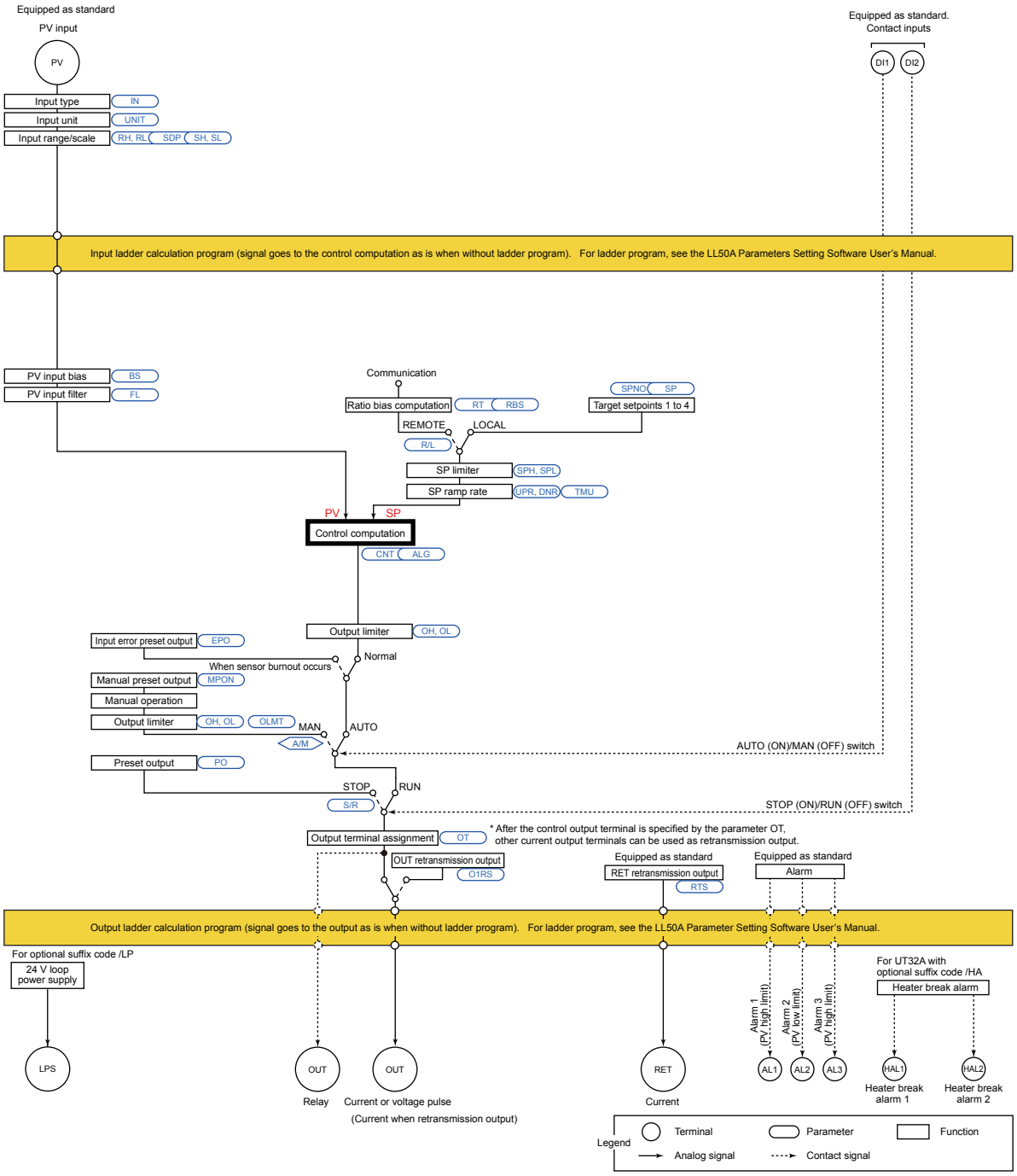
■ Block Diagram

Single Loop Control



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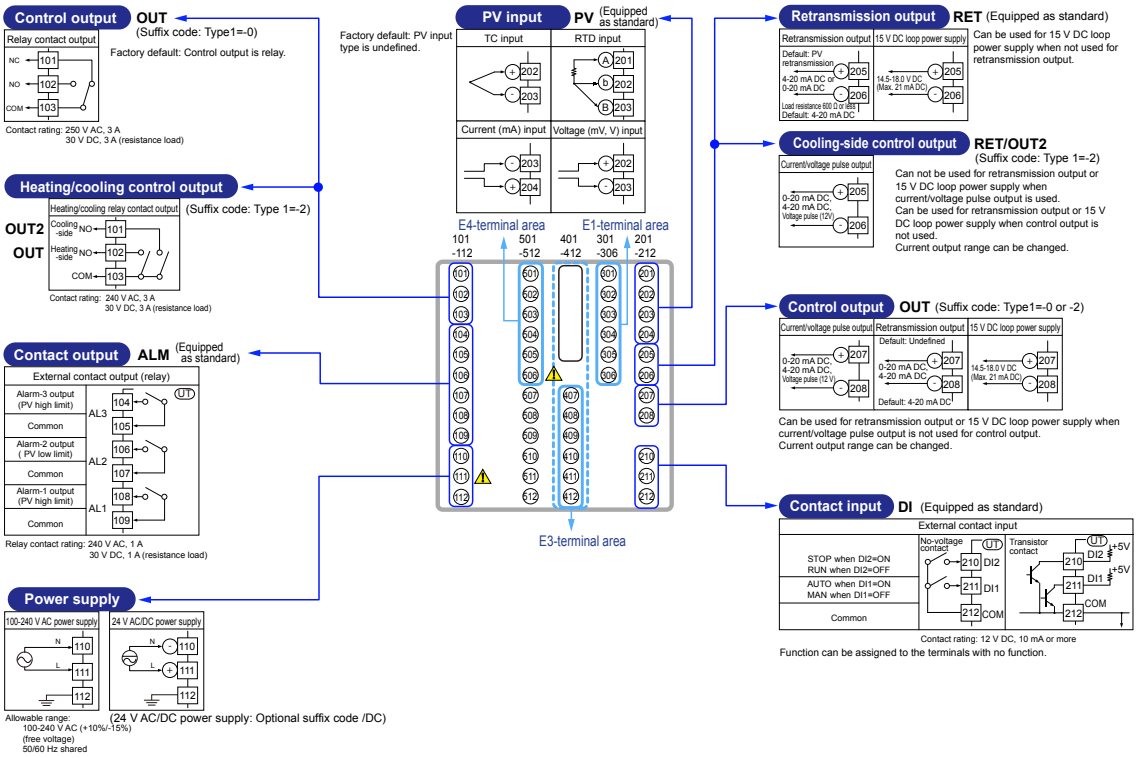
■ Terminal Arrangement

Terminal Arrangement for UT35A/MDL Single Loop Control


Control output
OUT
(Suffix code: Type1=-0)
Relay contact output
Factory default: Control output is relay.
Contact rating: 250 V AC, 3 A
30 V DC, 3 A (resistance load)
Heating/cooling control output
(Suffix code: Type 1=-2)
OUT2
OUT
Heating/cooling relay contact output
Cooling -side
Heating -side
Contact rating: 240 V AC, 3 A
30 V DC, 3 A (resistance load)
Contact output
ALM
(Equipped as standard)
External contact output (relay)
Alarm-3 output (PV high limit)
Common
Alarm-2 output (PV low limit)
Alarm-1 output (PV high limit)
AL3
AL2
AL1
Relay contact rating: 240 V AC, 1 A
30 V DC, 1 A (resistance load)
Power supply
100-240 V AC power supply
24 V AC/DC power supply
Allowable range:
100-240 V AC (+10%/-15%)
(free voltage)
50/60 Hz shared
(24 V AC/DC power supply: Optional suffix code /DC)
PV input
PV
(Equipped as standard)
Factory default: PV input type is undefined.
TC input
RTD input
Current (mA) input
Voltage (mV, V) input
E4-terminal area
E1-terminal area
E3-terminal area
Retransmission output
RET
(Equipped as standard)
Retransmission output
15 V DC loop power supply
Default: PV retransmission
4-20 mA DC or 0-20 mA DC
Load resistance 600 Ω or less
Default: 4-20 mA DC
14.5-18.0 V DC (Max. 21 mA DC)
Can be used for 15 V DC loop power supply when not used for retransmission output.
Cooling-side control output
RET/OUT2
(Suffix code: Type 1=-2)
Current/voltage pulse output
0-20 mA DC, 4-20 mA DC, Voltage pulse (12 V)
Can not be used for retransmission output or 15 V DC loop power supply when current/voltage pulse output is used.
Can be used for retransmission output or 15 V DC loop power supply when control output is not used.
Current output range can be changed.
Control output
OUT
(Suffix code: Type1=-0 or -2)
Current/voltage pulse output
Retransmission output
15 V DC loop power supply
Default: Undefined
Default: 4-20 mA DC
Can be used for retransmission output or 15 V DC loop power supply when current/voltage pulse output is not used for control output.
Current output range can be changed.
Contact input
DI
(Equipped as standard)
External contact input
STOP when DI2=ON
RUN when DI2=OFF
AUTO when DI1=ON
MAN when DI1=OFF
Common
No-voltage contact
Transistor contact
DI2
DI1
COM
+5V
Contact rating: 12 V DC, 10 mA or more
Function can be assigned to the terminals with no function.

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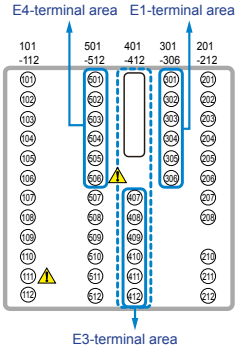
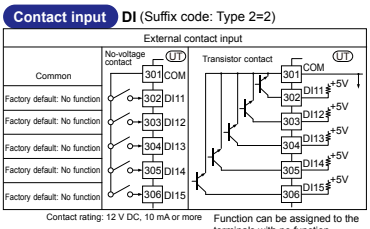


301-306 E1-Terminal Area

Contact input **DI** (Suffix code: Type 2=2)

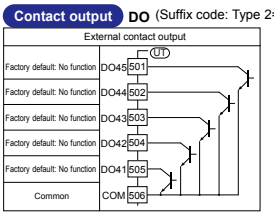


Contact rating: 12 V DC, 10 mA or more

Function can be assigned to the terminals with no function.

501-506 E4-Terminal Area

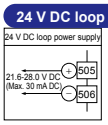
Contact output **DO** (Suffix code: Type 2=2)



Transistor contact rating: 24 V DC, 50 mA

Function can be assigned to the terminals with no function.

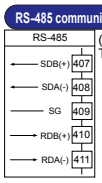
24 V DC loop power supply



LPS24
(Optional suffix code /LP)

401-412 E3-Terminal Area

RS-485 communication **RS485**



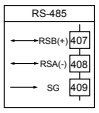
(Suffix code: Type 3=1)

Ethernet communication (with gateway function)

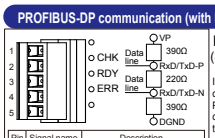
10BASE-T/100BASE-TX
RJ45 connector

ETHR
(Suffix code: Type 3=2)

Upper side LED (baud rate)	
Color	Amber
Lit	100M bps
Unlit	10M bps
Lower side LED (link activity)	
Color	Green
Lit	Linked
Blink	Active
Unlit	Link failure



PROFIBUS-DP communication (with Modbus master)

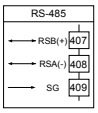


PROF
(Suffix code: Type 3=4)

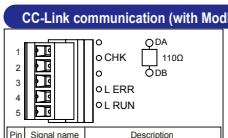
If the UT is located at the end of a segment for the PROFIBUS communication wiring, terminating resistors are separately needed. These are to be prepared by users. (390 Ω: 2 pcs. 220 Ω: 1 pc., or an active terminator.)

Pin	Signal name	Description
1	VP	+5V bus power
2	RxD/TxD-P	Data signal (positive data receive/transmit)
3	RxD/TxD-N	Data signal (negative data recive/transmit)
4	DGND	Signal ground
5	SHIELD	Shield ground

LED	Lit	Unlit
CHK (red)	User profile error	Normal
RDY (green)	Normal Communicating successfully	No power, or Communication failure
ERR (red)	Not connected, or communication failure (flashing)	Normal



CC-Link communication (with Modbus master)

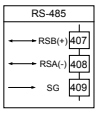


CC-L
(Suffix code: Type 3=3)

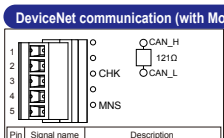
If the UT is located at the end of a segment for the CC-Link communication wiring, terminating resistors are separately needed. These are to be prepared by users. (110 Ω: 1 pc.)

Pin	Signal name	Description
1	FG	Flame ground
2	SLD	Shield
3	DG	RX/TX signal ground
4	DB	RX/TX - signal
5	DA	RX/TX + signal

LED	Lit	Unlit
CHK (red)	User profile error/ Address error	Normal
L ERR (red)	Communication failure (CRC error)	Normal
L RUN (green)	Normal Communicating successfully	No carrier detected/ Communication timeout



DeviceNet communication (with Modbus master)

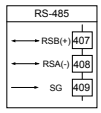


DNET
(Suffix code: Type 3=5)

If the UT is located at the end of a segment for the DeviceNet communication wiring, terminating resistors are separately needed. These are to be prepared by users. (121 Ω: 1 pc.)

Pin	Signal name	Description
1	V+	DeviceNet power supply 24V
2	CAN_H	RX/TX + signal
3	DRAIN	Shield/Drain wire
4	CAN_L	RX/TX - signal
5	V-	DeviceNet power supply common

LED	Lit/flashing	Unlit
CHK (red)	User profile error	Normal
MNS (green /red)	Normal, communicating successfully (green, lit). Not connected (green, flashing).	No electricity
	Critical link failure (red, lit). Connection timeout (red, flashing)	
	At power-on/Communication faulted (green/red, flashing)	



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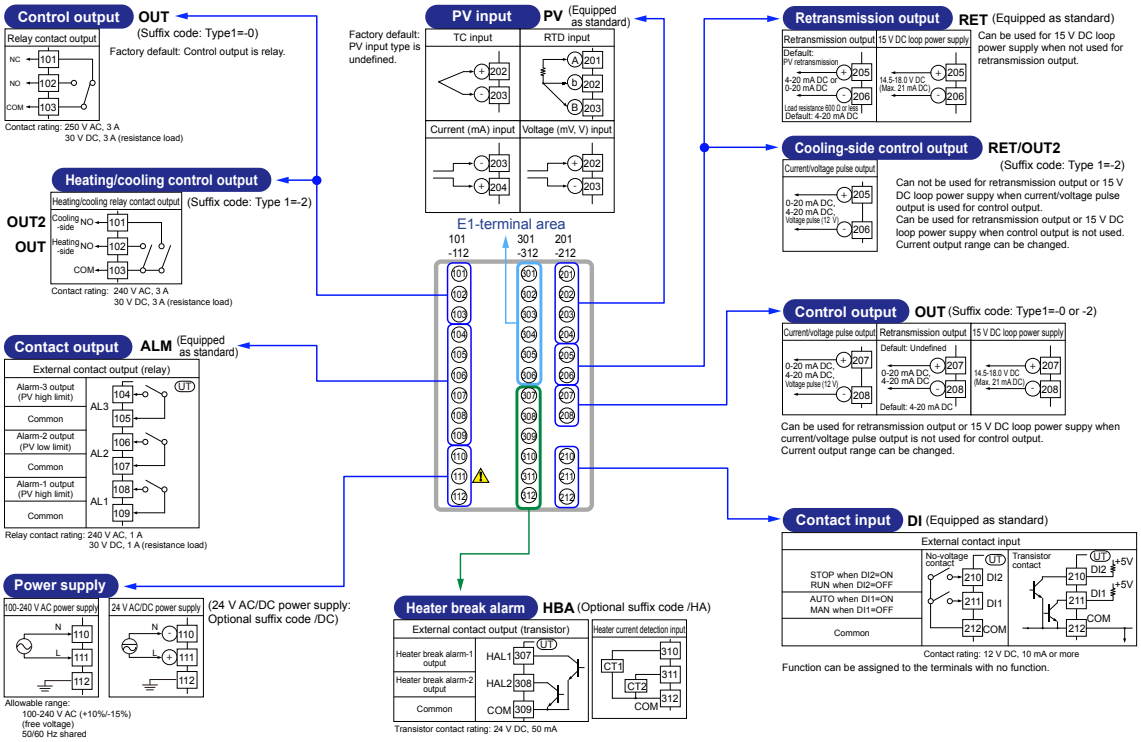
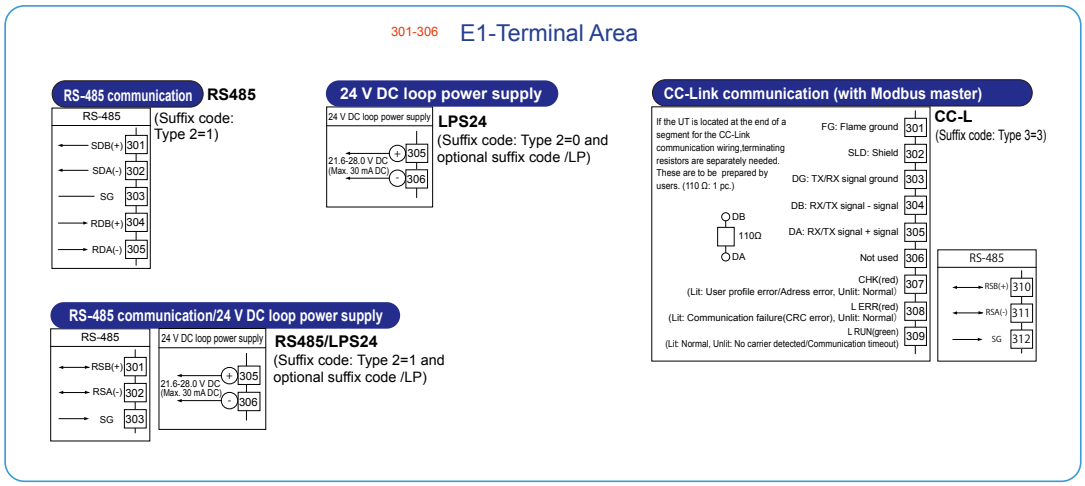
Terminal Arrangement for UT32A/MDL Single Loop Control


Control output
OUT
(Suffix code: Type1=-0)
Relay contact output
Factory default: Control output is relay.
Contact rating: 250 V AC, 3 A
30 V DC, 3 A (resistance load)
Heating/cooling control output
(Suffix code: Type 1=-2)
OUT2
OUT
Contact rating: 240 V AC, 3 A
30 V DC, 3 A (resistance load)
Contact output
ALM
(Equipped as standard)
External contact output (relay)
Alarm-3 output (PV high limit)
Alarm-2 output (PV low limit)
Alarm-1 output (PV high limit)
Common
Relay contact rating: 240 V AC, 1 A
30 V DC, 1 A (resistance load)
Power supply
100-240 V AC power supply
24 V AC/DC power supply
(24 V AC/DC power supply: Optional suffix code /DC)
Allowable range:
100-240 V AC (+10%/-15%)
(free voltage)
50/60 Hz shared
PV input
PV
(Equipped as standard)
Factory default: PV input type is undefined.
TC input
RTD input
Current (mA) input
Voltage (mV, V) input
E1-terminal area
101 -112
301 -312
201 -212
Heater break alarm
HBA
(Optional suffix code /HA)
External contact output (transistor)
Heater break alarm-1 output
Heater break alarm-2 output
Heater current detection input
Transistor contact rating: 24 V DC, 50 mA
Retransmission output
RET
(Equipped as standard)
Can be used for 15 V DC loop power supply when not used for retransmission output.
Cooling-side control output
RET/OUT2
(Suffix code: Type 1=-2)
Can not be used for retransmission output or 15 V DC loop power suppy when current/voltage pulse output is used for control output.
Can be used for retransmission output or 15 V DC loop power suppy when control output is not used.
Current output range can be changed.
Control output
OUT
(Suffix code: Type1=-0 or -2)
Default: Undefined
Default: 4-20 mA DC
Can be used for retransmission output or 15 V DC loop power suppy when current/voltage pulse output is not used for control output.
Current output range can be changed.
Contact input
DI
(Equipped as standard)
External contact input
STOP when DI2=ON
RUN when DI2=OFF
AUTO when DI1=ON
MAN when DI1=OFF
Common
Contact rating: 12 V DC, 10 mA or more
Function can be assigned to the terminals with no function.


301-306
E1-Terminal Area
RS-485 communication
RS485
(Suffix code: Type 2=1)
24 V DC loop power supply
LPS24
(Suffix code: Type 2=0 and optional suffix code /LP)
CC-Link communication (with Modbus master)
CC-L
(Suffix code: Type 3=3)
If the UT is located at the end of a segment for the CC-Link communication wiring,terminating resistors are separately needed. These are to be prepared by users. (110 Ω: 1 pc.)
FG: Flame ground
SLD: Shield
DG: TX/RX signal ground
DB: RX/TX signal - signal
DA: RX/TX signal + signal
Not used
CHK(red)
(Lit: User profile error/Adress error, Unlit: Normal)
L ERR(red)
(Lit: Communication failure(CRC error), Unlit: Normal)
L RUN(green)
(Lit: Normal, Unlit: No carrier detected/Communication timeout)
RS-485/LPS24
(Suffix code: Type 2=1 and optional suffix code /LP)

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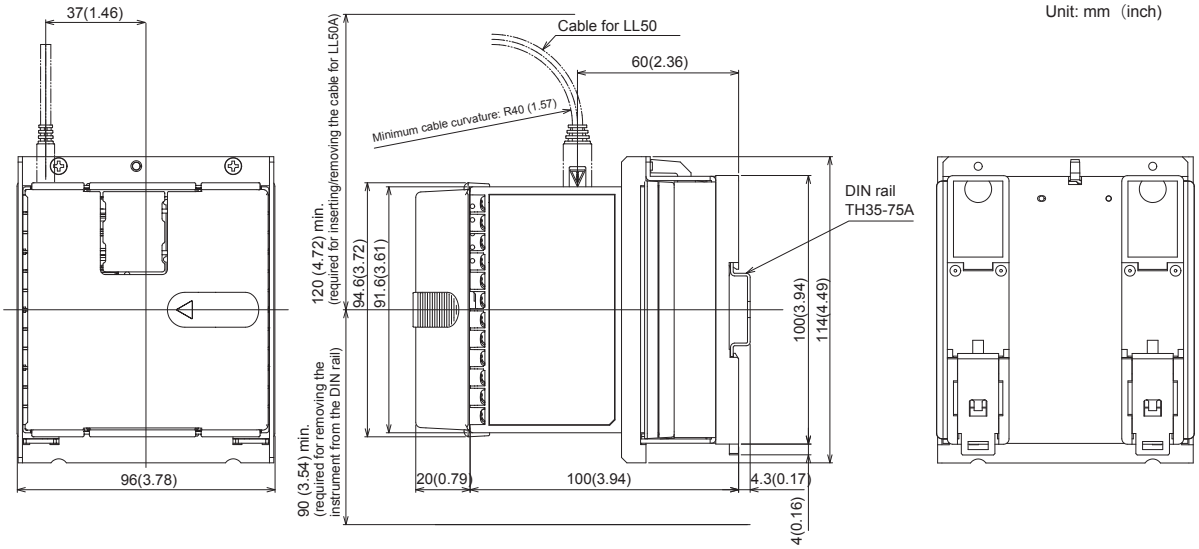
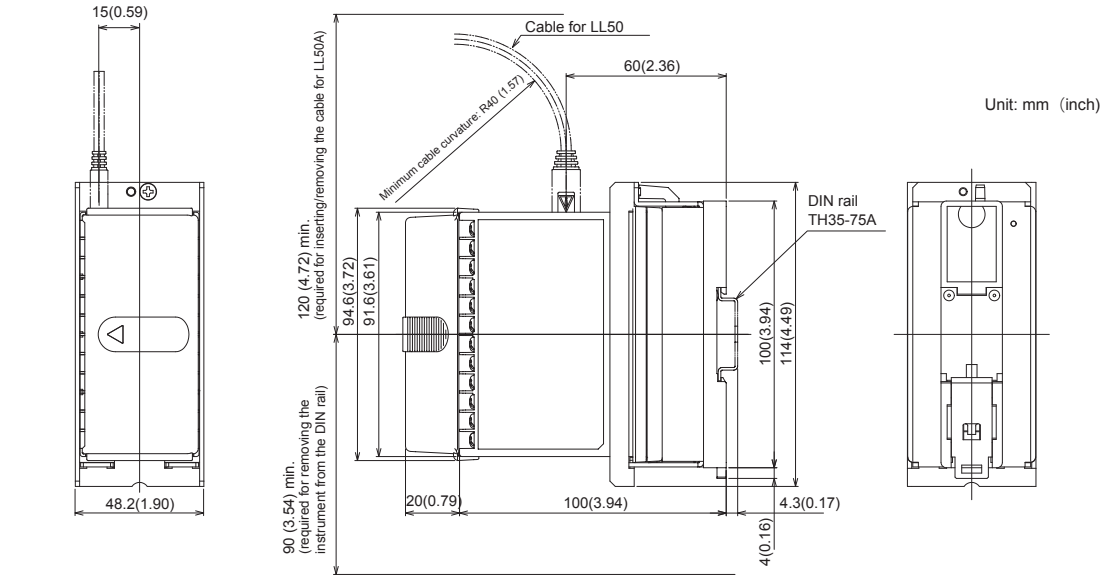
■ External Dimensions and Panel Cutout Dimensions

UT35A/MDL



Note:
Trigonometry
General tolerance = ±(JIS B 0401-1998 tolerance class IT18)/2

UT32A/MDL



Note:
Trigonometry
General tolerance = ±(JIS B 0401-1998 tolerance class IT18)/2

■ Construction, Mounting, and Wiring

- Construction: Panel mount type
- Material: Polycarbonate resin (Flame retardancy: UL94 V-0)
  DIN rail mounting bracket material: Panel steel sheet
- Case color: Black (Light Charcoal gray)
- Weight: 1 kg or less
- External dimensions (mm):
  UT55A/MDL: 96 (width) x 114 (height) x 100 (depth)
  UT52A/MDL: 48.2 (width) x 114 (height) x 100 (depth)
- Compatible DIN rails: TH35-7.5Fe, TH35-7.5Aℓ, JIS C 2812
- Mounting position: Horizontal.
- Wiring: M3 screw terminal with square washer (signal wiring and power)

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■ Model and Suffix Code

Model	Suffix code						Optional suffix code	Description
UT35A							**/MDL** (Required)	Digital Indicating Controller (Power supply: 100-240 V AC) (provided with retransmission output or 15 V DC loop power supply, 2 DIs, and 3 DOs) (without the display parts and keys)
Type 1: Basic control	**-0**							Standard type
	-2							Heating/cooling type
Type 2: Functions		**0**						None
		2						5 additional DIs, 5 additional DOs
Type 3: Open networks			**1**					RS-485 communication (Max.38.4 kbps, 2-wire/4-wire)
			2					Ethernet communication (with serial gateway function)
			3					CC-Link communication (with Modbus master function)
			4					PROFIBUS-DP communication (with Modbus master function)
			5					DeviceNet communication (with Modbus master function)
Fixed code				**-1**				Temperature unit: deg C & deg F
Case color					**1**			Black (Light charcoal gray)
Fixed code						**-00**		Always "-00"
Optional suffix codes							**/MDL** (Required)	Mount on DIN rail (without the display parts and keys) (*1)
							/LP	24 V DC loop power supply (*1)
							/DC	Power supply 24 V AC/DC
							/CT	Coating (*2)
							/CV	Terminal cover

*1: The /MDL option and /LP option can be specified in the combination of Type 2 code “0” and Type 3 code “1”.
*2: When the /CT option is specified, the UT35A does not conform to the safety standards (UL and CSA) and CE marking (Products with /CT option are not intended for EEA-market).

Model	Suffix code						Optional suffix code	Description
UT32A							**/MDL** (Required)	Digital Indicating Controller (Power supply: 100-240 V AC) (provided with retransmission output or 15 V DC loop power supply, 2 DIs, and 3 DOs) (without the display parts and keys)
Type 1: Basic control	**-0**							Standard type
	-2							Heating/cooling type
Type 2: Functions		**0**						None
		1						RS-485 communication (Max. 38.4 kbps, 2-wire/4-wire) (*1)
Type 3: Open networks			**0**					None
			3					CC-Link communication (with Modbus master function)
Fixed code				**-1**				Temperature unit: deg C & deg F
Case color					**1**			Black (Light charcoal gray)
Fixed code						**-00**		Always "-00"
Optional suffix codes							**/MDL** (Required)	Mount on DIN rail (without the display parts and keys) (*2) (*3)
							/LP	24 V DC loop power supply (*3)
							/HA	Heater break alarm (*4)
							/DC	Power supply 24 V AC/DC
							/CT	Coating (*5)
							/CV	Terminal cover

*1: When /LP option is specified, the RS-485 communication of the type 2 code “1” is 2-wire system.
*2: The /MDL option is specified, the model and suffix codes are follows:
UT32A-010-11-00/x/MDL
UT32A-003-11-00/x/MDL
UT32A-210-11-00/x/MDL
*3: When /MDL option and /LP option is combined, “3” can not be specified for Type 3 code.
*4: The /HA option can be specified only in the combination of Type2 code "1" and Type 3 code “0.”
*5: When the /CT option is specified, the UT32A does not conform to the safety standards (UL and CSA) and CE marking (Products with /CT option are not intended for EEA-market).

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■ Items to be specified when ordering

Model and suffix codes, whether User's Manual and QIC required.

■ Standard accessories

Operation Guide

■ Special Order Items

Model code	Suffix code	Description
LL50A	-00	Parameter Setting Software
X010	See the General Specifications (*)	Resistance Module

*: Necessary to input the current signal to the voltage input terminal.

Name	Model
Terminal cover (for UT35A)	**UTAP001**
Terminal cover (for UT32A)	**UTAP002**
User's Manual (CD)	**UTAP003**

User's Manual

Product user's manuals can be downloaded or viewed at the following URL. To view the user's manual, you need to use Adobe Reader 7 or later by Adobe Systems.

URL: http://www.yokogawa.com/ns/ut/im/

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